

# ENT SPECIFICA..

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## COMPLETE SPECIFICATION:

### Improvements in or relating to Ball Point Pen, Inks, and to Methods of Filling such Pens therewith.

We, FRANZ VERMES and MARIA VERMES, both German Nationals and both of 18  
Painkammerstrasse, Otterfing/Oberbayer-  
Germany, trading as VERMES-CHEMIE K.G.,  
do hereby declare the invention, for which we  
pray that a patent may be granted to us, and  
the method by which it is to be performed,  
to be particularly described in and by the  
following statement:—

10 The present invention is concerned with  
ball point pens and refills therefor containing  
an ink in paste form and is also concerned  
with a method of filling the reservoirs of said  
pens and of filling said pen refills.

15 Previously known ball point pen inks in  
paste form are glazing, i.e. they are not  
suitable for writing on dark surfaces, for  
example, on black album pages.

20 It is true that, in addition to soluble colour-  
ing media, it is also known to incorporate  
colour correction pigments in ball point pen  
inks in paste form. It has, however, previ-  
ously not been possible to produce ball point  
pens the pigment content of the inks of which  
25 was increased beyond 5% since, with too  
great a concentration, the pigments impair  
the writing properties of the ink, even when  
they are present in a very finely-divided  
form. It has, therefore, not been possible to  
30 produce ball point pens containing non-  
glazing, covering inks in paste form by in-  
creasing the amount of pigment added to the  
inks.

35 In addition to ball point pens with paste  
inks containing soluble colouring media and  
pigments, so-called "liquid pencils" are also  
known in which graphite is suspended in  
solvents. Because of the greyish black colour  
of graphite, it is, however, not possible to  
40 write on dark surfaces with these liquid

pencils, since the necessary contrast for  
legibility is lacking.

It is also known to produce inks which are  
applied by a pen, brush or spray gun, by  
introducing a ground metal powder into a  
layer of adhesive.

The use of aluminium metal powders for  
painting, coating, colouring or similar pur-  
poses is also known.

Finally, it is known to introduce organic  
or inorganic pigments into paste inks for ball  
point pens.

None of the known proposals has satisfied  
the requirements necessary for the production  
of ball point pens which are suitable for  
writing on dark surfaces, particularly for  
writing on album pages.

An object of the present invention is to  
provide ball point pens and refills therefor  
which are suitable for this purpose.

According to one aspect of the present  
invention, there are provided ball point pens  
and refills therefor, containing an ink in  
paste form which comprises a polar or a non-  
polar dispersing medium having dispersed  
therein finely-divided aluminium, silver or  
copper or an alloy or mixture thereof, in an  
amount of from 5 to 95% of the total weight  
of the ink.

In a preferred embodiment, the finely-  
divided metals or metal alloys are present in  
the ink in an amount of from 20 to 80% of  
the total weight of the ink and are in the form  
of flakes. Metal particles in the form of  
flakes are particularly suitable because they  
can easily be passed through the annular gap  
between the writing ball and the surrounding  
parts of the writing point, even when they  
are of relatively great extent in the direction  
of the periphery of the said annular gap. As  
a rule, the size of the writing ball diameter of

is about 1 mm. In this case, the water of the metal flakes can be between 1 and 20 microns, preferably between 5 and 15 microns.

5 It is surprising that metal particles, i.e. particles of relatively high specific gravity, remain dispersed in the dispersing media suitable for paste inks for ball point pens, even when stored or in use for long periods of time. It had, on the contrary, previously been assumed that, because of their high specific gravity, the metal particles would quickly precipitate.

10 The flake structure of the metal particles may contribute to the avoidance of the precipitation of the metal particles from the dispersing medium.

Whereas the usual procedure for filling ball point pen reservoirs is to introduce the paste ink from the rear into the reservoir, i.e. from the end remote from the writing point, whereupon any air inclusions are driven out by centrifuging, or else to introduce the ink from the front end and to set the writing point only on completion of the filling, whereupon centrifuging is also carried out in order to drive out air inclusions, when producing the ball point pens and refills therefor according to the present invention, it is advisable to introduce the ink from the front with the tip in position and to insert the writing ball on completion of the introduction of the ink. No centrifuging, which might lead to considerable de-mixing of the ink, is then necessary.

35 The width of the gap between the writing ball and the surrounding edge of the writing point is usually  $1 \times 10^{-4}$  to  $5 \times 10^{-3}$ , preferably  $1 \times 10^{-3}$  to  $2.5 \times 10^{-3}$  cm.

40 The polar and non-polar solvents customary in the ball point pen industry may be used as dispersing media for the metals.

The following examples are given to illustrate the inks used in the ball point pens and refills therefor according to the present invention:—

#### EXAMPLE 1.

50 To a mixture of 26 parts sulphonated castor oil (Turkey Red Oil), 16 parts polyglycol (molecular weight 400) and 8 parts glycerol, there are added 50 parts silver powder in flake form, the average particle size of which is 5—15 microns.

#### EXAMPLE 2.

55 To a solution of 20 parts chlorinated coumarone resin in 35 parts phthalic acid dioctyl ester and 15 parts castor oil, there are added 30 parts aluminium powder in flake form, the average particle size of which is 1—10 microns.

#### EXAMPLE 3.

To a solution of 14 parts coumarone resin in 32 parts phthalic acid dioctyl ester, there are added 6 parts aluminium powder in flake form, the average particle size of which is 1—10 microns, and 48 parts bronze powder consisting of an alloy of 92% copper and 8% zinc, the average particle size of which is 5—20 microns.

#### WHAT WE CLAIM IS:—

1. Ball point pens and refills therefor, containing an ink in paste form which comprises a polar or non-polar dispersing medium having dispersed therein finely-divided aluminium, silver or copper or an alloy or mixture thereof, in an amount of from 5 to 95% of the total weight of the ink.

2. Ball point pens and refills therefor according to Claim 1, wherein the finely-divided metal or alloy is present in the ink in an amount of from 20 to 80% of the total weight of the ink.

3. Ball point pens and refills therefor according to Claim 1 or 2, wherein the finely-divided metal or alloy is present in the ink in the form of flakes, the size of which is in the range of between 1 and 20 microns.

4. Ball point pens and refills therefor according to Claim 3, wherein the size of the flakes is within the range of between 5 and 15 microns.

5. Ball point pens and refills therefor according to Claim 1, substantially as hereinbefore described.

6. A method of filling the reservoirs of the ball point pens and of filling the ball point pen refills according to any of Claims 1 to 5, which comprises introducing the ink through the point of the pen and then inserting the writing ball into the point.

7. A method according to Claim 6, wherein the writing ball is of such dimensions that, between it and the surrounding part of the writing point, there is an annular gap of a width of between  $1 \times 10^{-4}$  and  $5 \times 10^{-3}$  cms. for the passage of the ball point ink during writing.

8. A method according to Claim 7, wherein the annular gap has a width of between  $1 \times 10^{-3}$  and  $2.5 \times 10^{-3}$  cms.

9. A method of filling the reservoirs of ball point pens and of filling ball point pen refills, substantially as hereinbefore described.

10. Ball point pens and refills therefor, whenever filled with ink by the method according to any of Claims 6 to 9.

For the Applicants:—

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